

Advanced Mars Water Acquisition System, Phase I

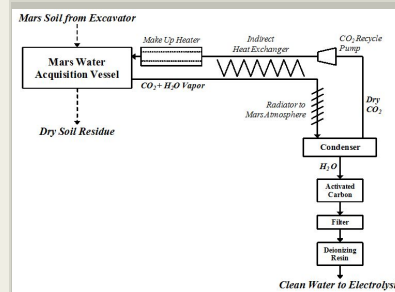
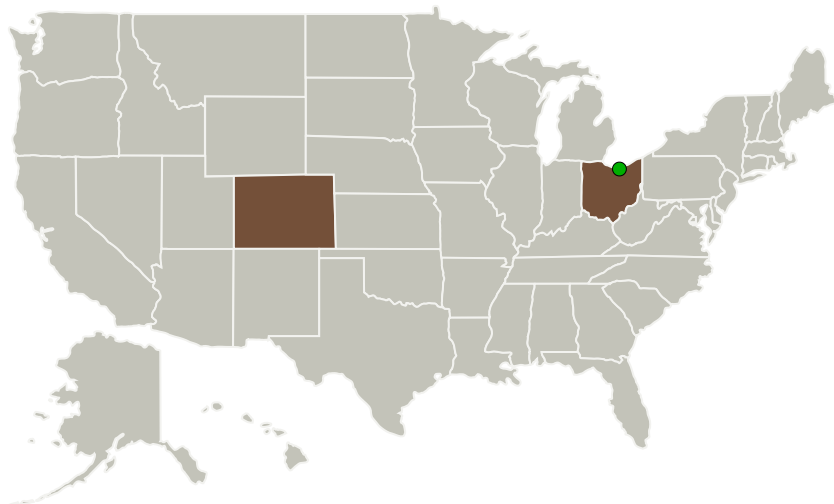
Completed Technology Project (2017 - 2017)



Project Introduction

The Advanced Mars Water Acquisition System (AMWAS) recovers and purifies water from Mars soils for oxygen and fuel production, life support, food production, and radiation shielding in support of human exploration missions. The AMWAS removes water from Mars soils using hot, recirculating carbon dioxide gas to provide rapid heat transfer. The AMWAS evaporates water from ice and salt hydrates, leaving dissolved contaminants in the soil residue. The water distilled from the extraction vessel is condensed, treated with activated carbon to remove residual volatiles and organic material, filtered to remove suspended solids, and subjected to deionization in preparation for proton exchange membrane electrolysis. Recuperative heat exchange is employed to minimize heat losses from recirculating carbon dioxide gas. Cold temperatures of the Mars atmosphere are used to facilitate condensation and separation of water from recycled carbon dioxide gas. A vacuum jacket is used to minimize heat losses from the extraction vessel. Much of the net heat input to the AMWAS can be supplied by solar concentrators or waste heat from radioisotope thermoelectric generators. The AMWAS vessel is equipped with a single, stationary seal that facilitates materials handling automation and minimizes potential leakage over the nominal operating period of up to 480 days.

Primary U.S. Work Locations and Key Partners



Advanced Mars Water Acquisition System, Phase I Briefing Chart Image

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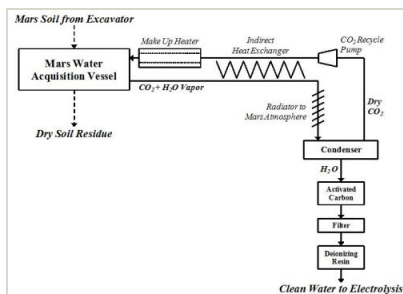
Organizations Performing Work	Role	Type	Location
Pioneer Astronautics	Lead Organization	Industry Historically Underutilized Business Zones (HUBZones)	Lakewood, Colorado
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Colorado

Ohio

Images



Briefing Chart Image

Advanced Mars Water Acquisition System, Phase I Briefing Chart

Image

(<https://techport.nasa.gov/image/133452>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Pioneer Astronautics

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

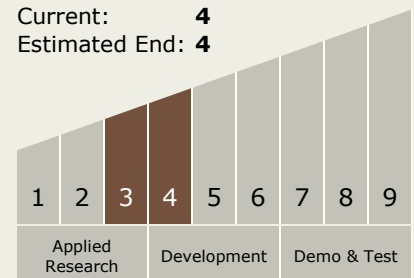
Mark Berggren

Technology Maturity (TRL)

Start: 3

Current: 4

Estimated End: 4



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.2 Resource Acquisition, Isolation, and Preparation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System